

REMARKS

In response to the Office Action mailed March 30, 2007, Applicant respectfully requests reconsideration. Claims 1-13 were last presented for examination. In the outstanding Office Action, claims 1-13 were rejected. By the foregoing Amendments, claim 14 has been added. Thus, upon entry of this paper, claims 1-14 will be pending in this application. Of these fourteen (14) claims, three (3) claims (claims 1, 12 and 14) are independent.

Based upon the above Amendments and following Remarks, Applicant respectfully requests that all outstanding objections and rejections be reconsidered, and that they be withdrawn.

Drawing Objections

The Examiner has objected to the drawings and states that the drawings must show the “synchronizing mechanism” recited in claims 6-10. Applicant respectfully disagrees with the Examiner’s assertions and would like to point out that the control devices 21 and 22 with their outlets 21’, 21”, 22’ and 22” shown in Fig. 1 correspond to the means by which “at least two rotations are synchronized” as recited in claims 6-10. Support for the control devices which synchronize the rotations recited in claim 6 can be found on page 9, lines 11-16, page 10, lines 15-21 and 25-30 for example.

Claim Rejections

Claims 6-10 have been rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement. In addition, claims 1-7 and 9-13 have been rejected under 35 U.S.C. § 102 (b) as being anticipated by Brodov et al. (Russian Patent no. 2,140,018). Finally, the Examiner has rejected claim 8 under 35 U.S.C. under 35 U.S.C. § 103(a) as being unpatentable over Brodov et al. in view of legal precedent.

Claim Rejections Under 35 U.S.C. § 112, first paragraph

The Examiner has rejected claims 6-10 under 35 U.S.C. § 112, first paragraph asserting that the claims contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In particular, the Examiner asserts that the specification and claims describe four different variants for transforming a motion of the elements of the machine. The Examiner states that in all variants, control devices 21 and 22 generate different motional inputs to elements 50 and 70. In the Examiner's opinion, the disclosure does not show how these motional inputs are generated.

Applicant respectfully disagrees with the Examiner's opinion. Specifically, elements 21', 22', 21'' and 22'' are synchronization mechanisms that are well known in the art with examples detailed in many references such as U.S. Patent No. 4,764,094, 3,975,120, 4,424,013 and 5,439,359 for example. Accordingly, the depiction of synchronization mechanism elements 21', 22'', 22' and 22'' as depicted in Fig. 1 is appropriate. The specification clearly specifies the nature of the motion in paragraphs 47 to 50 and paragraphs 51 to 54 and 55 to 60 specify how the synchronization is achieved. In this regard, and with reference to variant a), first elements 60 and 80 are fixedly retained, while second elements 50 and 70 are set in planetary motion with respect to elements 60 and 80, with equal angular velocities ω s (paragraph 51).

In variant b), first elements 60 and 80 rotate with a velocity of ω s/2, while second elements 50 and 70 are set in planetary motion with respect to elements 60 and 80, with equal angular velocities ω s (paragraph 52).

In variants a) and b), a self-synchronization takes place between the two sets, because surfaces 250 and 270 roll respectively over surfaces 160 and 180.

In variant c), first elements 60 and 80 on one hand, second elements 50 and 70 on the other hand, have the same movements as in a) or b); but a distance is maintained between the internal and the external conjugated sets (between elements 60 and 70)(paragraph 53).

In variant d), for instance, a contra-rotary motion is set to the two second elements 60 and 80. Because of the contact between first elements 50 and 60, self-synchronization takes place and element 50 is set in rotation at a speed $\omega_s = -2 \omega_{re}$. The element 50 transmits a swivelling to element 70 in synchronism and in phase (paragraph 54). Moreover, the relative speeds of the different elements are specified by paragraphs 57 to 60. Thus, the specification provides a detailed description of what the movements of the different elements should be. The movements of the conjugated sets are either a planetary movement, or a differential rotary motion.

Such planetary movements and differential rotary motion are well known in mechanics and are the basis of all gearing assemblies. Therefore, it is unnecessary to provide detailed description of the mechanisms thereto. Moreover, the self-synchronization aspect is clearly shown in Fig. 1.

Synchronisation can be achieved either by mechanical means (self-synchronization, gearing systems like in mechanical gear boxes, etc.), and/or by electronic means (using for example position sensors, timers, communication links between the controllers of the first and the second set, etc.). In view of the foregoing, Applicant contends that the specification is sufficiently enabling and respectfully requests that the rejection of claims 6-10 be reconsidered and withdrawn.

35 U.S.C. § 102 Rejection

The Examiner has rejected claims 1-7 and 9-13 under 35 U.S.C. § 102(b). Specifically, the Examiner asserts that the present invention is anticipated by Brodov et al. (Russian patent 2,140,018, *hereinafter* Brodov). Applicant respectfully disagrees with the Examiner's characterization of Brodov and its application to the present invention. Brodov generally discloses methods of generating differential motion in two-dimensional volumetric displacement machines such as motors, compressors, pumps and internal combustion engines such as Diesel, Otto, and Wankel engines. Brodov also discloses means to increase the number of independent degrees of freedom of rotational motion to two and the number of working cycles of change in volume of combustion chambers in internal combustion engines. Thus, Brodov is dedicated to two-dimensional machines. In contrast thereto, claim 1 of the present invention recites:

A method of transforming a motion in a volume screw machine, said machine having at least two sets of conjugated elements (80, 70; 60, 50), each set comprising a first element (80, 60) having an inner screw surface (180, 160) centered around a first axis (passing through centre O) and a second element (70, 50) having an outer screw surface (270, 250) centered around a second axis (passing through centers Om_2 , Om_1), wherein an inner set (50, 60) of conjugated elements is placed coaxially in at least one cavity of the second element of an outer set (80, 70) of conjugated elements,

wherein the first and second axes (passing through centers O; Om_1 , Om_2) are parallel and wherein at least one of said first and second elements of each set is rotatable about its axis,

said method comprising:

creating a rotary motion of at least one element in each set

As recited in claim 1, line 1, the method of the present invention is directed to a method of transforming motion in a volume screw machine. Brodov does not disclose generating motion in a volumetric screw machine as recited in claim 1 of the present invention. Instead, Brodov is directed to two-dimensional machines such as internal combustion engines. Since Brodov does not disclose the generation of motion in a volumetric screw machine it does not disclose each and every element of claim 1 and thus does anticipate claim 1.

Similarly, claim 12 of the present disclosure recites:

A volume screw machine of rotary type, comprising at least two sets of conjugated elements (80, 70; 60, 50), each set comprising a first element (80, 60) having an inner screw surface (180, 160) and enclosed therein a second element (70, 50) having an outer screw surface (270, 250), said machine comprising an outer set of conjugated elements (80, 70) and at least one inner set of conjugated elements (60, 50), wherein each inner set of conjugated elements (60, 50) is placed in a cavity of an element (70) of another set of conjugated elements (80, 70).

Here again, claim 12 is directed to a volume screw machine. Brodov is not directed to a volumetric screw machine but rather to two-dimensional machines such as internal combustion engines. Accordingly, Brodov does not each and every element of claim 12 and, therefore, cannot anticipate it. Accordingly, claims 1 and 12 are not anticipated by Brodov. Independent claims 1 and 12 are, therefore, patentable and Applicant respectfully request, that the rejection of claims 1 and 12 be reconsidered and withdrawn. Moreover, dependent claims 2-11 and 13

respectively depend from claims 1 and 12 and, accordingly, are also patentable for at least the same reasons.

35 U.S.C. § 103 Rejection

The Examiner has rejected claim 8 of the present invention under 35 U.S.C. § 103(a) as being unpatentable over Brodov in view of legal precedent. The Examiner states that Brodov fails to disclose two sets of conjugate elements comprising differential motion and asserts that it would have been obvious to one of ordinary skill at the time the invention was made to have differential motion in both sets of conjugate elements.

Applicant respectfully disagrees with the Examiner's rejection of claim 8. As pointed out with respect to the Examiners rejection under 35 U.S.C. 102, Brodov is directed to two-dimensional machines such as internal combustion engines not volumetric screw machines as is disclosed in the present invention. Screw machines operate quite differently from two-dimensional machines. In two-dimensional machines, the fluid movement takes place substantially in a plane perpendicular to the rotation axis. In contrast thereto, in screw machines, fluid movement it takes place along the direction of the rotation axis. The kinematics of the fluid are completely different and the structure of the machines is also completely different. Screw machines need to be of small diameter, but may be quite long.

Brodov discloses a machine quite different from that of the present invention. Moreover, there is no teaching or suggestion in Brodov that would encourage one skilled in the art to modify that which is disclosed in Brodov to arrive at the present invention. It would not have been obvious, therefore, for a person skilled in screw machines, to use the teachings of Brodov to design a screw machine as in the present invention. Moreover it has been shown above that claim 1 is patentable. Claim 8 depends from claim 1 and is therefore patentable for at least that reason.

Dependent Claims

The dependent claims incorporate all of the subject matter of their respective independent claims and add additional subject matter, which makes them *a fortiori* independently patentable

over the art of record. Accordingly, Applicants respectfully request that the outstanding rejections of the dependent claims be reconsidered and withdrawn.

Conclusion

In view of the foregoing, this application should be in condition for allowance. A notice to this effect is respectfully requested.

Applicants reserve the right to pursue any cancelled claims or other subject matter disclosed in this application in a continuation or divisional application, cancellations and amendments of above claims, therefore, are not to be construed as an admission regarding the patentability of any claims and Applicants reserve the right to pursue such claims in a continuation or divisional application.

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